4.7 VISUAL IMPACT PREDICTIONS

Where assessments of proposed project impacts are being made with a specific project in mind, public awareness and sensitivity will likely be increased. Public value judgements may well be coloured by the threat of development. In these cases it must be made very clear whether the public or the professional involved is being asked to a) assess the inherent quality of the landscape itself, or b) assess the sensitivity of the landscape to a specific development.

In answer to the above, once VR Management Classes have been established by inventory and assessment, a considerable degree of guidance can be given proposed developments as they arise. Thus development can be avoided in highly sensitive areas or modified by specific design guidelines to reduce visual impacts. Visual impact predictions are important at this point to determine if a development should occur and where.

Visual impact predictions are based on the compatibility or misfit between development alternatives and the landscape's visual quality, i.e. its relative sensitivity to alteration of its inherent visual characterics by management activity. However, if descriptive inventory and assessment factors have not been pre-determined, visual impact predictions will be difficult to carry out.

There are four basic procedures for conducting visual impact predictions:

1. Contrast Ratings (as modified from BLM)
2. Establishing landscape control points
3. Computer graphics
4. Simulation

These procedures are discussed at some length in the following section.

4.7.1 CONTRAST RATINGS

Contrast ratings based on previous scenic quality evaluations reveal existing features and their respective elements that will be subject to the greatest visual impact. The degree of contrast with basic landscape patterns brought about by a specific development is the primary criterion for determining suitability or adaptability of such a proposal within each designated VR Management Class.

Contrast ratings should be made from key observation points (KOP) or points that will be commonly used by observers. The following factors are to be considered:

- Distance. Foreground site locations hold highest impact potentials.
- Angle of observation. As the angle nears 90 degrees it is most critical.
- Length of time during which proposed project will be viewed. There may be a need for short and long term objectives since some projects are self-mitigating, e.g., dam construction and strip mining.
- Relative size or scale created by projects.
- Season of year (indicating heaviest use).
- Lighting. Sidelighting is best for accurate contrast evaluation.

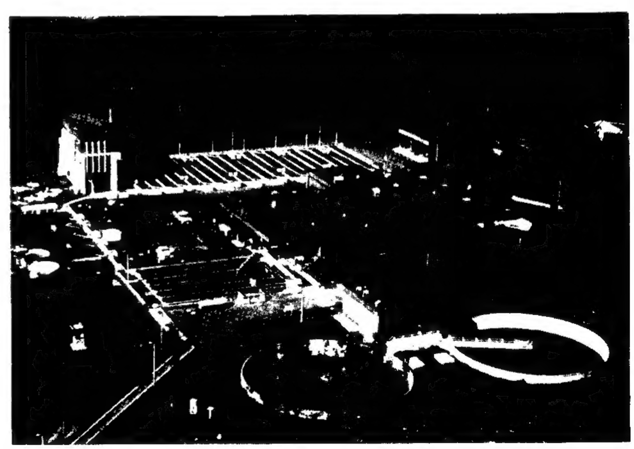


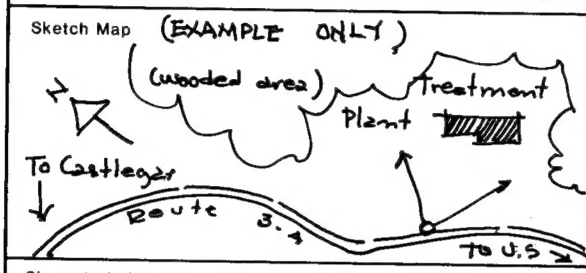
PLATE 4.21 This sewage treatment plant within VRMA 14-B meets Class III VR Management requirements. (B.C. Ministry of Environment photo) See page 62

TABLE 4.7

Proposed Field Form #1: Assigning Visual Contrast Ratings
(Modified from USDI Bureau of Land Management, 1980 and Sheppard et.al., 1979)

VISUAL RESOURCE CONTRAST RATING SHEET

Project Name Sewage Treatment Plant	**Date** 9-20-82
Location Map: NTS 82F SE · Scale: 1:50 000 Regional District: Central Kootenay Strategic Planning Area: Kootenay - Slocan Section: · Range: · Township: Longitude: 117.30 · Latitude: 49.30	
Sketch Map	VRMA: S. Columbia Mts. Landscape Unit: Castlegar Evaluated By: [illegible] Checked By: P.Z. Visual Resource Management Class: III Key Observation Point # 1 of 2



Characteristic Landscape

	Element	Descriptors[1]	Comments
LAND/WATER	Form	Landform (3-D) water, soil pattern	Rolling to steep around site. Mod. contrast
	Line	Regularity/continuity	Little line def. in landform: Irreg. Continuity
	Color	Soil, rock, ice, snow, hue, value, chroma	Grey to deep brown: glacial till over bedrock
	Texture	Clarity, grain	Soil texture not evident from KOP
	Scale	Landform/waterform mass and area	Landform subord. in f.g. but rises above site
VEGETATION	Form	Regularity, simplicity, orientation	Regular, simple, vertical: D Fir, WRC + aspen
	Line	Direction, regularity edge character	No riparian definition. Edges irregular
	Color	Hue, value, chroma	Hue deep green. Value medium. Chroma dull
	Texture	Clarity, grain	Course textured, dense, even ordered
	Scale	Size, area surrounding objects	Basic conif 2nd growth to 80 ft: not dominant.
STRUCTURES	Form	Regularity, simplicity orientation	Simple, low profile + compact
	Line	Direction, regularity continuity, simplicity	Horiz. dominant: largely surfaced areas: blends well w/surroundings
	Color	Reflectivity, hue value, chroma	Grey to white hues; tanks have high chroma (white) Blends well.
	Texture	Clarity, grain	Textured conc. + untreated wood surfaces
	Scale	Size, height, width, surrounding areas	Observer above from KOP#1 Thus low VAC but low profile: not competetive w/surround.
LANDSCAPE	General Description	Define characteristic landscape, regional setting etc.	Landscape unit dissected by Columbia R. Strong topog. Interior wet belt
	Scale	Expansive, bounded, area enclosure; visual unit	Bounded strongly by rolling to rugged forested landscape
	Spatial Composition	Focal, feature enclosed. panoramic canopied; weak to strong	Site is moderately focal: is in fg of views of river, thus highly sensitivity to viewing

[1] Refer to Chapter II, Concepts (Adapted from VSDI Bureau of Land Management, 1978 and Smardon et al., 1982).

TABLE 4.8

Proposed Field Form #2: Establishing Contrast Rating Scores for Project Visual Impacts (Modified from Sheppard et.al., 1979)

1

Relative Importance of Visual Elements in Contrast Ratings

Procedure:
Multiply weighting assigned to each visual element against degree or contrast, i.e., strong (3) moderate (2) weak (1) and none (0)

Visual Elements & Weighted Values	Introduced or Modified Components		
	Land/Water	Vegetation	Structures
Color Contrast (4x) Weighting	High 12 Moderate 8 Low 4 None 0	High 12 Moderate 8 Low 4 None 0	High 12 Moderate 8 Low 4 None 0
Form Contrast (4x) Weighting	High 12 Moderate 8 Low 4 None 0	High 12 Moderate 8 Low 4 None 0	High 12 Moderate 8 Low 4 None 0
Line Contrast (3x) Weighting	High 9 Moderate 6 Low 3 None 0	High 9 Moderate 6 Low 3 None 0	High 9 Moderate 6 Low 3 None 0
Texture Contrast (2x) Weighting	High 6 Moderate 4 Low 2 None 0	High 6 Moderate 4 Low 2 None 0	High 6 Moderate 4 Low 2 None 0
Scale Contrast (3x) Weighting	High 9 Moderate 6 Low 3 None 0	High 9 Moderate 6 Low 3 None 0	High 9 Moderate 6 Low 3 None 0

2

Overall Rating

To arrive at an Overall Rating one must review the Contrast Rating (box #1) and use the criteria listed below.

Overall High if 1-3 components high or 3 components medium

Overall Medium if 1-2 components medium with no higher ratings

Overall Low if 1-3 components low with no higher ratings

Overall None if all components None

	Overall Element Ratings	Overall Element Scores
Color	High 12 Moderate 8 Low 4 None 0	8
Form	High 12 Moderate 8 Low 4 None 0	8
Line	High 9 Moderate 6 Low 3 None 0	3
Texture	High 6 Moderate 4 Low 2 None 0	4
Scale	High 9 Moderate 6 Low 3 None 0	6
Total Contrast Score		29

3

Scale Dominance

Major object in confined setting	Dominate	12
One of several major objects or major object in an unconfined setting	Co-dominate	8
Significant object relative to setting	Subordinate	4
Small object relative to setting	Insignificant	0

Comments Treatment plant could be brought more closely in line with Class III VRMA by additional screening from KOP #1

4

Composite Visual Impact Severity

Add the score from box #2 (Overall Contrast Rating) to the score from box #3 (Scale Dominance) to get the Composite Visual Impact Severity Number. Compare the CVIS Number with the accompanying table to choose the Sensitivity Class.

Composite Visual Impact Severity $\boxed{33}$

	Class I and I(SZ)............	Negligible	0 - 11
	Class II.....................	Low	12 - 23
✓	Class III....................	Moderate	24 - 35
	Class IV.....................	Strong	36 - 47
	Class V and V(R) and V(E)....	Severe	48 - 60

5

Summary

Project Name: Sewage Treatment Plant

	Class	Severity	Score
Project Visual Impact	III	Mod.	33
Visual Resource Management Class Requirement (maximum)	III	24-35	

Does the project meet the Visual Resource Management Class Requirement?

Yes [X]

No [ ]

Assessor: [illegible]

Date: 10-10-82

Each VR Management class describes a different degree of modification allowed in the basic elements of the landscape. The primary character of the landscape should be retained regardless of the degree of modification allowed.

A theoretical project will serve as an example. Plate 4.21 illustrates a sewage treatment plant within VRMA 14-B. The facility is in place but a proposal for its expansion has been initiated by the Regional District. The existing plant requires a visual contrast rating to determine whether or not it meets the requirements of VR Management Class 111, into which it falls.

Completing the proposed field form #1 (Table 4.7) for assigning visual contact ratings is the first step in the assessment. It sdhould be filled out in the field, where direct observations can reveal basic quality ilnformation relateed to form, line, colour, texture and scale. At this level of assessment, the characteristic landscape is defined in terms of descriptive inventory. This may or may not have been done for the entire VRMA.

These data are then related to the proposed project in terms of evident contrasts. VRMA Field Form #2 (Table 4.8) is used for this purpose. Usingf this form, the sewage treatment plant is compared with existing site conditions, element by element, feature by feature according to the degree of contrast involved, e.g. strong = 3, moderate = 2, low = 1 and 0 = no contrast. Thus the element's weighted value multiplied by the degree of contrast equals the magnitude of visual impact. Weighted values for each element (form, line, color, texture and scale) are based on its significance in the landscape as determined by scenic quality levels, sensitivity levels and distance zones. For example, in this case the sewage treatment plant contrasted moderately (2) with the surrounding landforms (4) for a rating of 2 x 4, or 8, while it contrasted strongly (3) in texture (2) with the surrounding vegetation for a rating of 2 x 3, or 6 (Table 4.5).

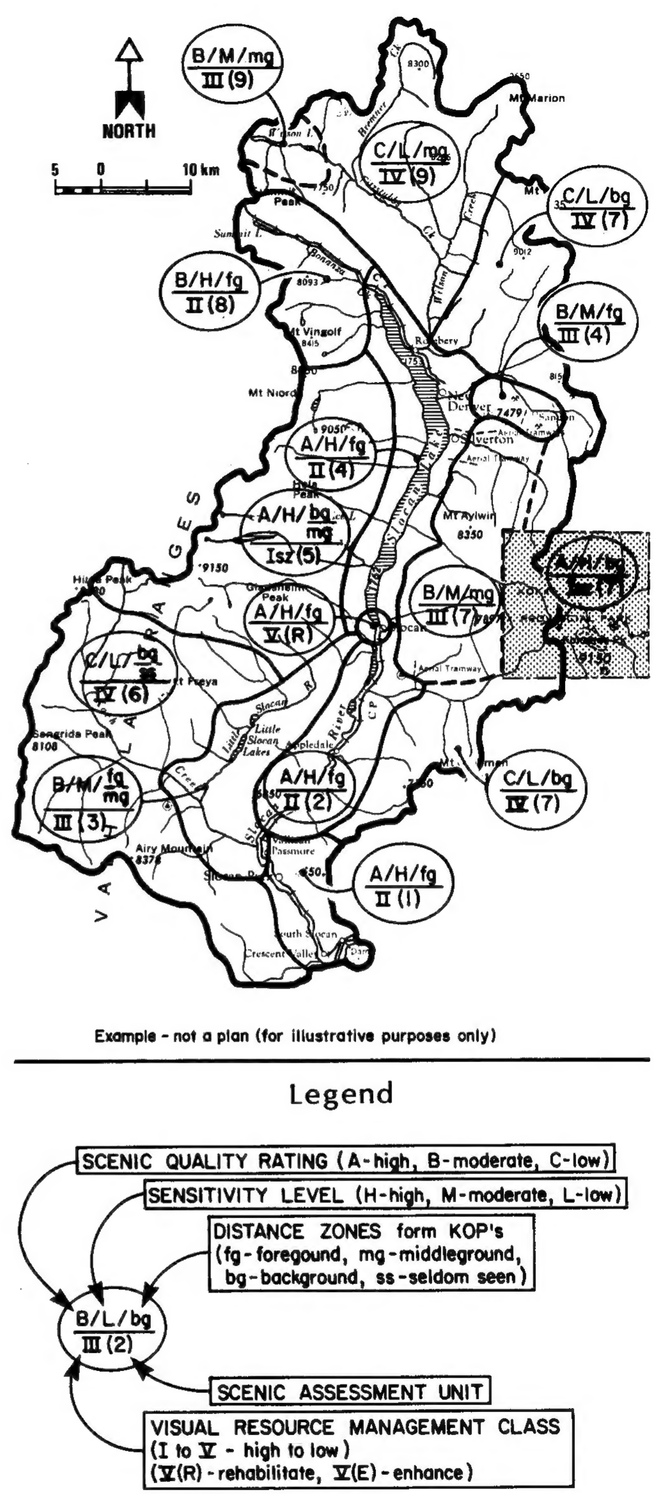


FIGURE 4.9 Slocan Valley Landscape Unit: Management Class Structure - A Summary Map

A composite score of contrasts with all elements indicated the degree of magnitude of impact occasioned by the proposed development.

Contrast rating scores as outlined can be related to VR Management Classes by assigning maximum and minimum allowable rating scores within each class. Table 4.6, "VR Management Class Requirements" is used for this purpose. If the composite visual impact rating score, (tabulated summary on Field Form #2 as a sum of overall element ratings and scale dominance factors) is too high to be accomodated in the Management Class, the project must be modified by design, re-located in a lower VR Management Class area or disallowed. In the example shown, severity was judged "moderate" with a total impact score of 33. Since Management Class 111 requirements range from 24 to 35, the project is acceptable.

It is important to note that visual contrast rating assignments as outlined above will vary within each VRMA and cannot be categorically specified for the province at large until adequately field tested under actual conditions.

4.7.2 LANDSCAPE CONTROL POINTS[1]

One effective system for office and field-checking probable impacts of development on the visual resource is by establishing landscape control points (Litton, 1973). In this method, a set viewpoint from which the landscape would normally be seen is established and mapped. Drawings from this point can be made and used to predict changes. Basically, the method involves setting up cross-sectional diagrams from a point or points of observation to the subject area to determine seen and unseen areas.

As with contrast ratings, it is essential in this system to establish KOPs , or points from which the proposed development would be seen by the greatest number of people for the greatest period of time. Lines are then drawn on the map from one or several KOP's (Figure 4.10) to ridgelines or

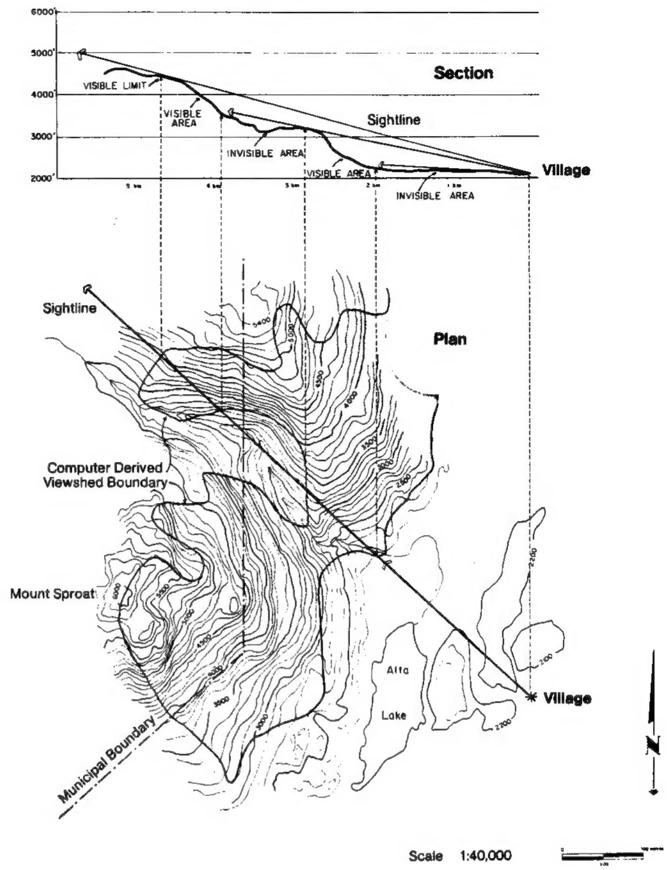


FIGURE 4.10 Landscape Control Points (Adapted From B.C. Forest Service. Landscape Handbook, 1982)

points of highest elevation within the line of vision. A vertical scale is then made of points of intersection, with contours plotted in section. This should reveal areas seen and not seen from each KOP at a topographical level. Tree heights must then be estimated to give a more precise definition of seen or unseen areas. This information can be gained from forest cover maps, obtainable from the B.C. Ministry of Forests.

The main difficulty with the landscape control point system lies in the time required for

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[1] Synonymous with Key Observation Points (KOP) as outlined in the User Guide.

drawings, both in the field and office. However, until more areas in British Columbia are digitized for computer entry the Landscape Control Point System remains a viable method for assessing visual impact predictions in conjunction with field contrast ratings and VAC studies. (For a more detailed outline of the system see Litton, 1973).

4.7.3 COMPUTER ASSISTED PROGRAMS

Computer graphic systems now available for illustrating viewed areas, times seen and impact frequencies include the following: Viewit, Preview, Perspective Plot and Mosaic.

Viewit is capable of delineating terrain visible from both single and multiple observer points, demonstrating viewed areas, times seen and impact frequencies (Travis, Elsner et al., 1975). It can also depict slope and aspect data in varying degrees of shaded patterns.

FIGURE 4.11 Viewit: An Example of Application

Perspective Plot is used largely for selection of cut blocks in forested areas where visual imapct can be determined from varying observer points and from different azimuth angles (Twito, 1978). It places the proposed cut block in perspective outline by tree symbols and is highly manipulative. This program is written specifically for use on desktop computer systems such as the Hewlit - Packard 9845 or Wang 2200 LVP. The system has been further developed to depict utility poles and lines, road cuts, water storage areas and similar projects where ditigal control can be obtained (see Nickerson, 1980).

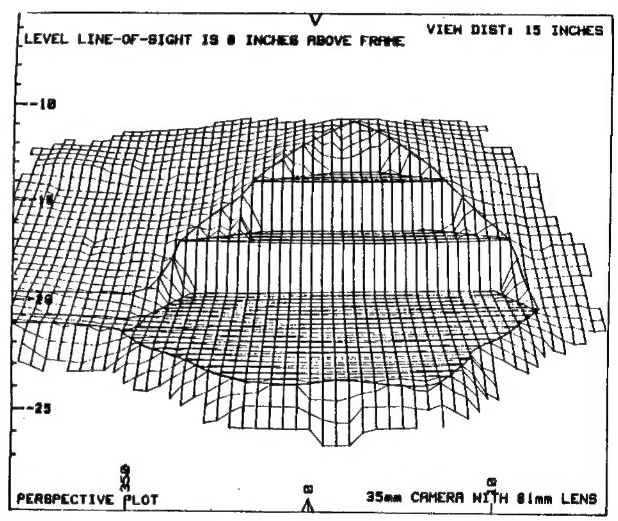


FIGURE 4.12 Perspective Plot: An Example of Application

Preview, in addition to rendering perspective diagrams from digitized data, is capable of graphically illustrating vegetative cover, rock outcrops, water bodies and ground cover as well (Myklestad et al., 1976). It has proven useful in selection of suitable ski slopes, borrow pits, road locations and cut block proposals.

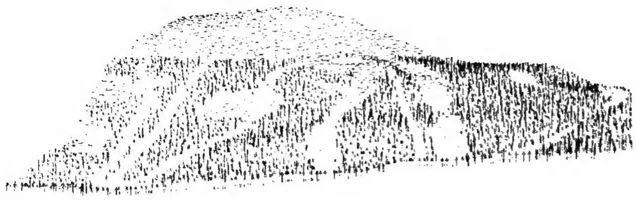


FIGURE 4.13 Preview: An Example of Application in British Columbia (Source: Angelo, 1979)

4.7.4 SIMULATION

Visual predictions may also be made through simulation, which can either be photographic or mechanical, and often combines well with computer graphics.

In this rapidly developing field, actual, predictable results of placing a management activity within the landscape can be seen (Blair, 1981). Black and white, or preferably colour, photographs of the project area are projected and enlarged on a screen. The proposed development can then be drawn onto the enlarged screen or photographic format, or another photograph of the proposal superimposed on the area photo. In large areas contrast ratings, coupled with simulation and computer graphic displays, can be very effective determinants of probable impact levels.

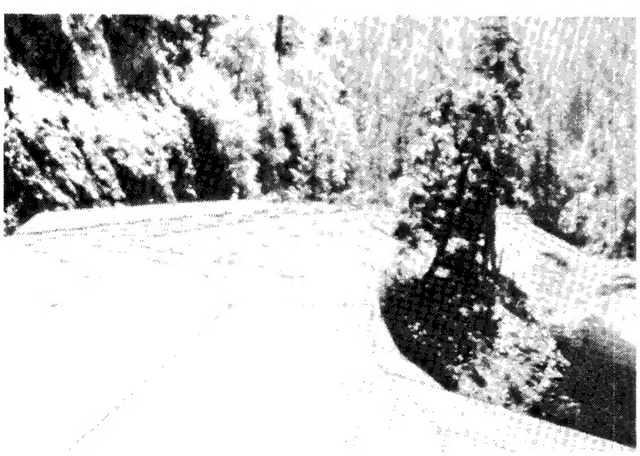


PLATE 4.22 Visual impacts of cuts, fills and alignment can be simulated by computer graphics if digital terrain data is available

The use of visual simulation methods in British Columbia has been minimal, due largely to the lack of a digitized contour data base and limited technical experience with the system. Figure 4.13 illustrates the recent use (1979) of Preview for simulation of a proposed ski development. In a more recent example, the B.C. Parks and Outdoor Recreation Division employed photography, sketches and balloon-assisted simulation to graphically depict the visual effect a proposed power transmission line would have within an existing park area. Figure 4.14 (top) is a sketch of the area as it presently exists. Figure 4.14 (bottom) is a simulation of the same area as it would likely appear after clearing, grading and installation of power poles. Clearing widths and pole locations were obtained from Provincial highway and B.C. Hydro engineers and located in the field. Actual pole heights were then simulated by the use of balloons, which were released at each pole location, then allowed to rise to the actual pole height. Photographs were taken of the simulation and later translated to sketch form as noted.

The above system is less costly than computer assisted methods but limited to projects where digital information is either unavailable, inappropriate or unnecessary. Its main value lies in depicting above-ground vegetation and structures with scale and perspective accuracy beyond that of such systems as Perspective Plot, and Preview which depict trees, rocks and objects in symbolic form only. More specific current and past project information may be obtained from the B.C. Parks and Outdoor Recreation Division, the British Columbia Institute of Technology (Angelo, 1979) and the School of Forestry, University of British Columbia (Young, 1978).

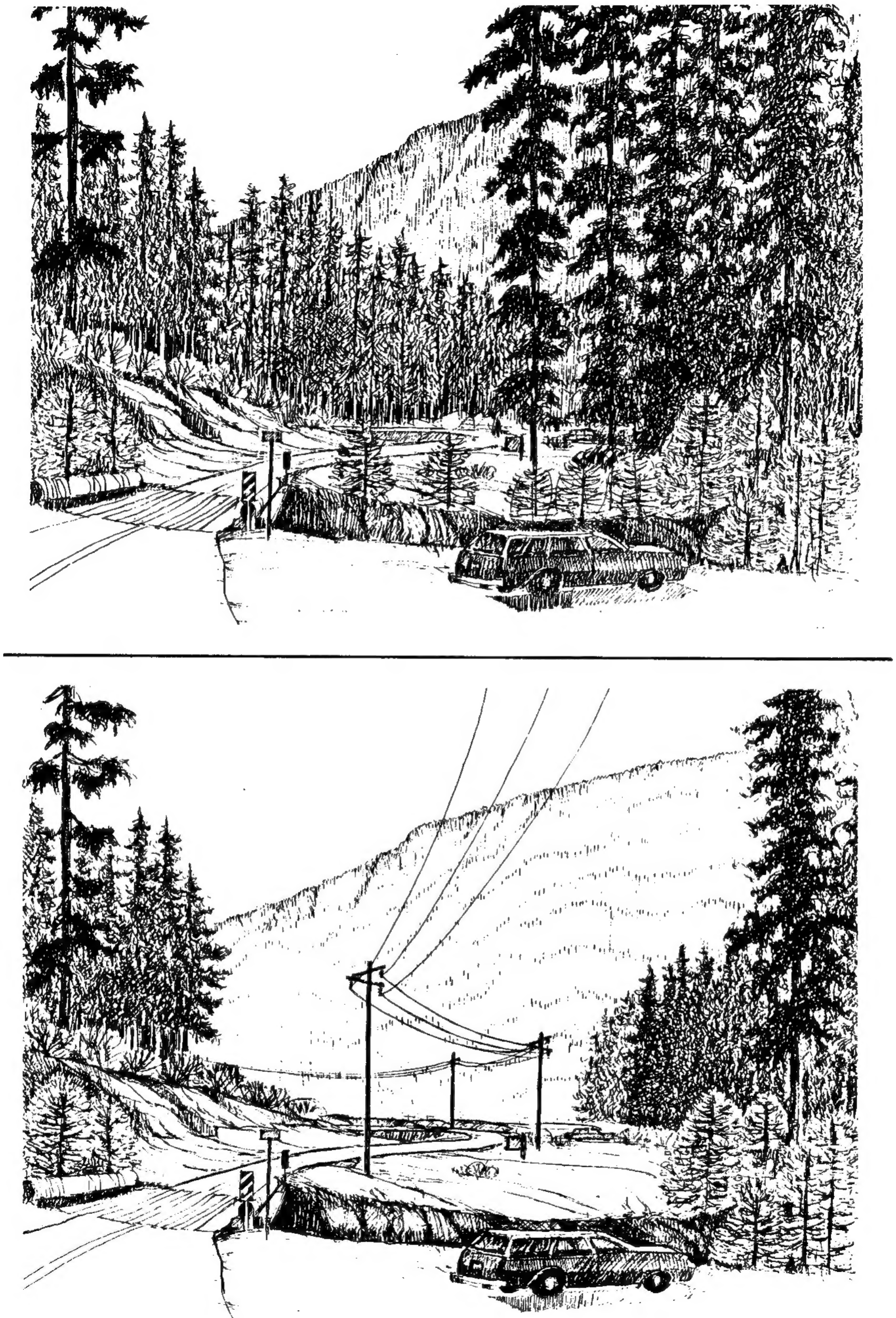
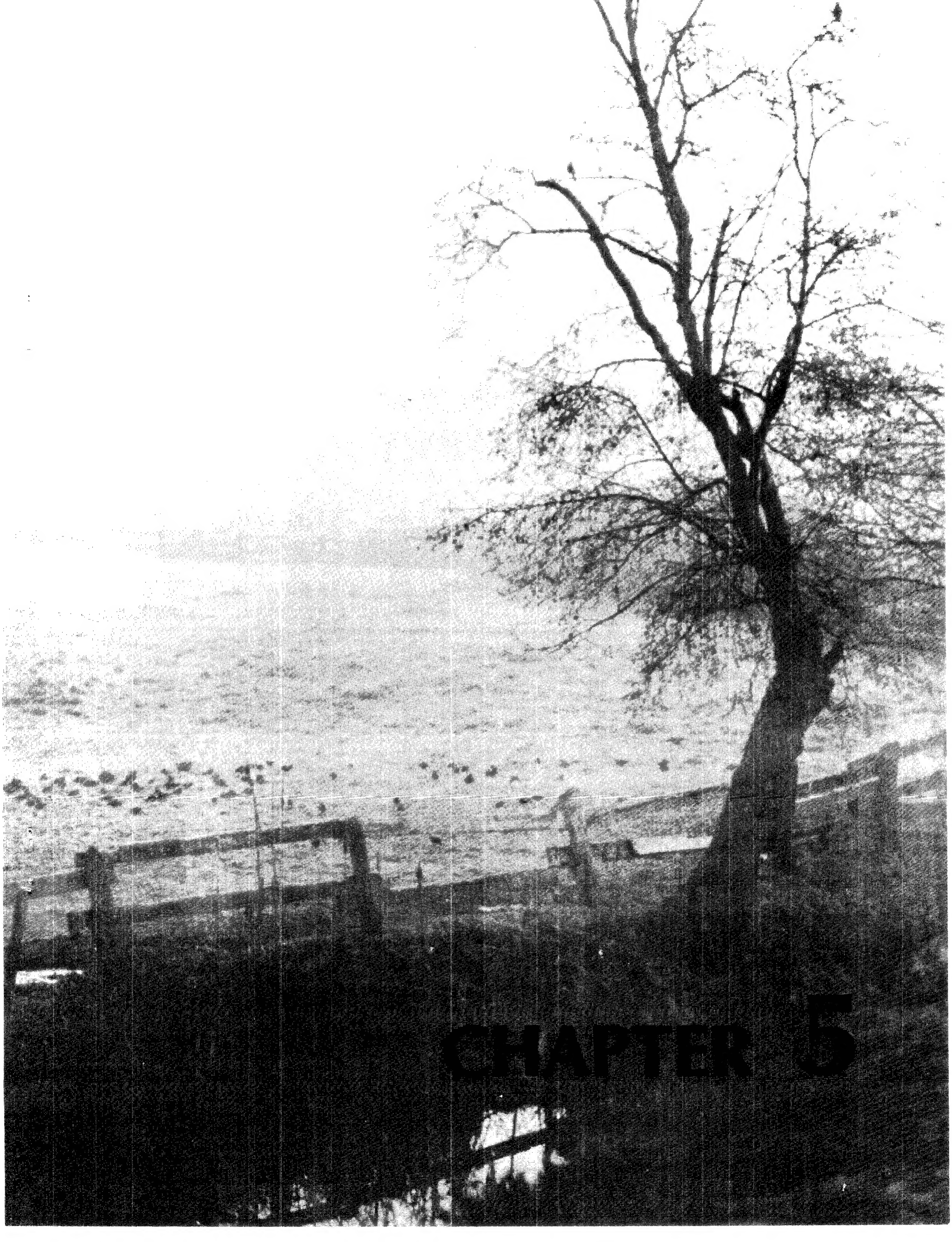


FIGURE 4.14 Simulation Technique: An Example of Application in British Columbia (Original Drawings by Rina Pita)

4.7.5 SUMMARY

Although the four methods of determining visual impact predictions appear to be fragmented and somewhat complex they are not unrelated. Basically the Contrast Rating System can be given greater objectivity by supplementing assigned and weighted values with the other three methods, depending upon the nature, scale and intent of the proposed activity and its consequent impact. Developing rating skills in contrast estimation is the key to conducting effective visual impact predictions. This skill can only be gained by actual on-the-ground applications of methodologies outlined.



CHAPTER 5

Man survives by taking in four kinds of nourishment: food, water, air and impressions of his environment (Ouspensky, 1968).

Chapter Separator Photo

PLATE 5.1 Early morning mists rise over fenced meadows in this rural B.C. scene. (B.C. Ministry of Environment photo)

5 MANAGEMENT OPTIONS

In the final analysis, decisions to allow or disallow development in visually sensitive areas are essentially political but based on economic factors as well. This may, and often does, present problems where aesthetics are not given sufficient consideration. Thus it is of great importance that descriptive inventory and subsequent visual evaluations portray the consequence(s) of any development as they will affect visual quality - in economic as well as aesthetic terms. Management must then exercise options for its placement in the landscape. In some cases, for example, a transmission line right of way or coal extraction operation places little demand upon a landscape rarely seen or one sufficiently diverse to carry the operation with little visual impact. At other times various management options will need to be reviewed. These fall into the following general categories: mitigation, enhancement, rehabilitation, alternate site locations, or disallowance of the project. In all instances it should be the aim of the visual analyst to work toward accommodation of development in the landscape with as little disturbance as possible to its natural qualities and in accordance with provincial and regional requirements since such development may well be necessary and desirable for our economic and social well being.

5.1 MITIGATION

This option can usually be carried out by means of project design. A harsh exterior can be softened by wood or masonry reflecting the colour, hue and intensity of the surrounding landscape. Storage tanks can be painted, utility towers modified, vertical buildings reduced in scale. Architectural, engineering and landscape architectural treatments may often be the only requirements needed to bring the proposed development up to acceptance within the specified minimal management class requirement. Cost factors may preclude such treatment, in which case compensation will be required. (See B.C. Environment and Land Use Committee, 1980, and B.C. Ministry of Energy, Mines and Petroleum Resources, 1982, for clarification of energy and linear development application procedures in British Columbia).

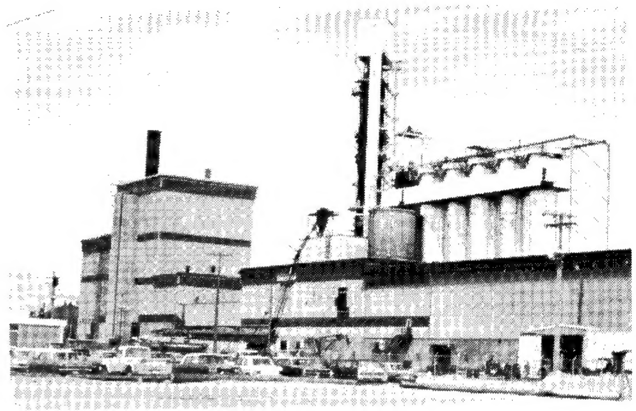


PLATE 5.2 Structural harmony and carefully textured surfaces combine to mitigate the visual impact of this industrial complex. (B.C. Ministry of Environment photo)

PLATE 5.3 The southern approach to Cranbrook could be greatly enhanced by the introduction of vegetation screening and ground cover

5.2 ENHANCEMENT

Another option is enhancement of visual attributes of a project or project area by design